

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
7 August 2003 (07.08.2003)

PCT

(10) International Publication Number
WO 03/065394 A2

(51) International Patent Classification?: **H01G 9/20**

(21) International Application Number: **PCT/US03/02355**

(22) International Filing Date: 24 January 2003 (24.01.2003)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
10/057,394 25 January 2002 (25.01.2002) US
60/351,691 25 January 2002 (25.01.2002) US
60/368,832 29 March 2002 (29.03.2002) US
60/400,289 31 July 2002 (31.07.2002) US

David; 31 Coolidge Avenue, Lexington, MA 02420 (US).
ZHENG GUO, Zhu; 2456 Massachusetts Ave., Apt.302,
Cambridge, MA 02140 (US).

(74) Agent: **BIANCO, John, V.**; Testa, Hurwitz & Thibault,
LLP, High Street Tower, 125 High Street, Boston, MA
02110 (US).

(81) Designated States (*national*): AE, AG, AL, AM, AT, AU,
AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU,
CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH,
GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC,
LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW,
MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE,
SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VC,
VN, YU, ZA, ZM, ZW.

(71) Applicant: **KONARKA TECHNOLOGIES, INC.**
[US/US]; 100 Foot of John Street-Boott Mill-South, Third
Floor, Lowell, MA 01852 (US).

(72) Inventors: **CHITTIBABU, Kethinni**; 46C Hampshire
Drive, Nashua, NH 03063 (US). **GAUDIANA, Russell**;
2 Penrose Lane, Merrimack, NH 03054 (US). **HAD-
JIKIRYRIACOU, Savvas, E.**; 46 Varney Street, Apt. #
1, Lowell, MA 01854 (US). **LEE, Michael**; 278 Salem
Road, Billerica, MA 01821 (US). **LI, Lian**; 733 Wellman
Avenue, N. Chelmsford, MA 01863 (US). **BALASUB-
RAMANIAN, Srinii**; 201 Main Street, #14, Woburn,
MA 01801 (US). **CARDONE, John**; 27 Glen Drive, W.
Peabody, MA 01960 (US). **HE, Jin-An**; 49 East Meadow
Lane, Apt.#37, Lowell, MA 01854 (US). **WALLER,**

(84) Designated States (*regional*): ARIPO patent (GH, GM,
KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW),
Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),
European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE,
ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, SE, SI,
SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN,
GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— without international search report and to be republished
upon receipt of that report

For two-letter codes and other abbreviations, refer to the "Guid-
ance Notes on Codes and Abbreviations" appearing at the begin-
ning of each regular issue of the PCT Gazette.

(54) Title: PHOTOVOLTAIC CELL COMPONENTS AND MATERIALS

(57) Abstract: A polymeric linking agent enables the manufacture of photovoltaic cells at low temperatures (< about 300 °C) on flexible substrates, including, for example, polymeric substrates. Photovoltaic cells may be fabricated by a relatively simple continuous manufacturing process, for example, a roll-to-roll process, instead of a batch process. Processes and compositions that cause the gelling of liquid electrolytes at relatively low temperatures also facilitate the fabrication of flexible photovoltaic cells. Methods and chemical structures that improve the adhesion of a photovoltaic material to the substrates and that produce mechanically stable nanoparticle formulations are also described. Furthermore, co-sensitizers that co-adsorb with a sensitizing dye to the surface of an interconnected semiconductor oxide nanoparticle material increase the efficiency of photovoltaic cells by improving their charge transfer efficiency and reducing the back transfer of electrons from the interconnected semiconductor oxide nanoparticle material to the sensitizing dye.

WO 03/065394 A2